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PRIVILEGED & CONFIDENTIAL
ATTORNEY WORK PRODUCTS

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SUMMARY OF DATA ON L-ASPARAGINE MONOHYDRATE

Abstract. L-Asparagine monohydrate is a non-essential amino acid that occurs naturally in plants and animals. It is proposed for use in reaction flavors for smoking products. There is no available literature on its toxicology. However, it has been reported to stimulate ornithine decarboxylase activity by increasing the half-life of the enzyme. The thermal stability of L-asparagine is described in a Russian paper that has not yet been translated into English.

I. Background. L-Asparagine (Synonyms: α-aminosuccinic acid, aspartic acid ß-amide, altheine, asparamide, agedoite) is a nonessential amino acid. It occurs both free and protein bound in all organisms. In plants, it occurs as a storage form, and in animals it occurs as a detoxification form of ammonia. Free L-asparagine occurs in plants and plant seedings (e.g., asparagus). It has been isolated from sprouting vetch (Vicia sativa L., Leguminosae, Piria, 1848; Piutti, 1886; Chemical abstracts, 1925), from white lupine, and from soybean seedlings (Vickery et al., 1942).

A process has been developed by Avebe, a Dutch company, for producing this amino acid as a by-product in potato processing (Chem. Ind. 107: 527, 1984). The L-asparagine extracted from potato starch is 99 percent pure (dry weight).

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Solubility:	**water: 0.95% w/w at 0°C 3.53% at 28°C 52.75% at 100°C**
	ethanol, methanol, ether, benzene: practically insoluble
pk:	**2.02, 8.80**
Appearance:	orthorhombic bisphenoidal crystals

STRUCTURE

$NH_2COCH_2CH(NH_2)COOH$

The thermal stability of L-asparagine is described in a Russian paper which has not been translated (Kalis et al., 1989).

IV. Toxicology. There is no available literature on the human health effects, acute toxicity, subchronic or chronic toxicity, carcinogenicity, genotoxicity, reproductive toxicity, teratology, or immunotoxicity of L-asparagine.

A. Metabolism. L-Asparagine is biosynthesized by amidation of asparate (asparagine-synthetase catalyzed), which in turn is derived from oxaloacetate receiving the amino group from glutamate in a transamination reaction.

The catabolism of L-asparagine is glucogenic. It is hydrolyzed by asparaginase to ammonia and aspartate. Aspartate is then transaminated to oxaloacetate or converted into fumarate by the urea cycle. It forms metabolic intermediates that can be converted into glucose or be oxidized by the citric acid cycle.

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